

Technical Evaluation Report

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The following evaluation report is structured in two parts.

Part 1 Evaluation of the papers presented

Part 2 Technical remarks that should help to improve future meetings.

INTRODUCTION

RTO translates technology into military capabilities. Symposia bring together scientists, decision and policy makers. Thus the organizers welcomed observers from the COMEDS WG on Preventive Medicine. One other aim of RTO symposia is to induce networks of scientists in the various armies of NATO Member Nations. This aim has been achieved during this symposium and other contacts have been founded.

The “Operational Medicine” area of the RTO Human Factors and Medicine Panel focuses on all health problems pre-, during and post-deployment in a large group of different Technical Teams. In most cases, their activities are focused on specific health problems. This symposium, however - initiated by the problems of asymmetrical warfare and recent technical developments - attempted to integrate the different aspects of monitoring the soldiers’ health status pre-, during and post-deployment. Especially because of the problems that are encountered during worldwide deployments there was a need for a comprehensive view of all aspects of health protection. These topics must not be seen as individual health problems only, but as those of the population (or society).

The organizers divided the large spectrum of presentations into four sessions:

- Epidemiology Techniques for Surveilling Specific Health Conditions
- Surveillance Information: Tools and Techniques
- Laboratory Techniques and Technology for Surveillance
- Epidemiology techniques for Military Forces Surveillance.

Part 1 Evaluation of the Presentations

A major lesson learned from the Gulf War was the need for a comprehensive deployment health surveillance system. Suspected adverse affects from vaccines and other preventive health measures, and unconfirmed exposures to toxic substances have resulted in long term challenges for military leaders and health care professionals. This is one of the major driving forces for the close surveillance of soldiers during deployment.

The purpose of this Symposium was to bring together Public Health, Occupational Health and Military Health professionals to discuss the strategies and technologies available to existing and emerging threats.

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The specific objectives would be to share expertise and approaches so that the protection of the health of deployed NATO forces might be optimized.

One of the shortcomings, however, of the – otherwise - excellent symposium was the absence of speakers from major European countries including GE, UK, FR, PL, SP, PO, CZ, HU, IT. However, the presence of the delegates of COMEDS WG on Preventive Medicine made an information transfer into their countries possible.

The symposium was to address technology and policy for medical surveillance systems to support the protection of the health of NATO forces across the continuum of operations (e.g., garrison operations through war and relief operations). In addition to considering support for NATO warfare operations, the symposium addressed the technology and policy necessary for sustainment of adequate public health systems and population health in future NATO areas of operation. Finally, the symposium was to address the state-of-art and importance of providing medical aid within the following hours (or minutes) of the occurrence of a catastrophe - this response can make the difference between a successful relief operation and a collection of a large number of casualties.

The first key note on United States Force Health Protection and Deployment Health Policy and Programs: Policy Support through Automation Systems by Mrs. E. EMBREY, Deputy Assistant Secretary of Defence, Force Health Protection and Readiness (US) gave an overview on the US programs. She described a three pillars approach to the most valuable topic the US has the health of its servicemen and women.

The **first pillar**, ensuring a healthy and fit force, focuses on programs that set standards and promote health and fitness force-wide was addressed by the epidemiological papers of the first day trying to approach standards for a mentally healthy service man.

The **second pillar** of force health protection focuses on programs designed to prevent injury and to protect the force against health hazards. The Software systems to fulfill this aim are being developed and in part even fielded. Thus soon the US will have a huge warehouse of data which need further processing. If however the ergonomic needs of the user who has to enter the data are neglected the data may be not trustworthy. Thus there seems to be a need for considering this problem too.

The **third pillar** of force health protection focuses on DoD's programs which provide world class medical and rehabilitative care anywhere in the world will be addressed during the next RTO Symposium in St. Petersburg this summer.

Throughout history military forces have suffered more casualties from endemic disease and accidents than from military action (DNBI). This trend continues in the era of peacekeeping operations and operations other than war (OOTW) that now occupy the alliance. Reducing these diseases or at least giving early warnings and proficient medical support is paramount for the military who rely on manpower und human well being.

The threat may be presented by infections caused by various emerging respiratory pathogens or known biological warfare. Both groups of agents often present themselves initially as influenza-like illnesses. Thus there is interest in a near-real-time system that can monitor affected soldiers and relatively rapidly identify both covert attacks involving biological agents and emerging respiratory pathogens. The advantage of rapid diagnostics under field conditions was addressed in five (rather) sophisticated papers which at the moment stem from research laboratories but soon may be issued for field use.

Gathering the different presentations under single headings one could state that ten papers reported on US efforts for surveillance of the soldier with the aims of giving the commanders the needed information on

actual well being of their soldiers as well as gathering the information in some centralized data banks where all information comes together “from cradle to grave” which make epidemiologic research more effective in the future.

The epidemiological papers with regard to mental health screening deal with the problem that people suffering from mental diseases are stigmatized. Consequently even interrogation may cause stigmatization. If however, a very large group is screened, it is difficult to draw a border line between those who need further observation or even treatment and those who are just a modification in the broad spectrum from normal to ill. It may be overt as in PTSD or more or less hidden in depression, substance abuse, job loss, unemployment, divorce, and spouse abuse. The causes of such deviations from “normality” may on one hand be the unusual situation(s) during deployment with its different physical and social environment or the inability of the individual to cope with these problems the causes of which may be far back in his/her pre-military life. The detailed research done by Canadian, US-American, Bulgarian and Dutch researchers is impressive and demonstrates the borders of medical-social-psychological research. Are those with poor social nets attracted by the military or does the military weaken social resources? Questions very difficult to answer but very important in order to have men and women in the forces that are able to cope with the problems of unsymmetrical war fare.

Apparently, most of the screening tools do not have sufficient sensitivity, specificity and predictive value to base a treatment on it. Long term observations of large cohorts after a standardized screening is needed before we can reach evidence based levels. The symposium offered the opportunity that these scientists met and it may start a common evaluation of the existing data. Additionally, it is possible that the limits and standards for the normal population may not apply to the military.

It is very good to see that small parts of the large mosaic of protecting our troops come from epidemiological studies that per se at first glance appear to have little to do with the war fighter such as papers by ZHORZHOLIANI and by KARSELADZE both from Georgia. Apparently, they have the very good opportunity to study adolescents early in their lives and possibly may follow them through a military career.

Within the area of data collection and processing various systems exist.

GEIS (Global Emerging Infectious Surveillance) as explained by Kenneth COX is aimed at early recognition of epidemics and possible terrorist attacks. It will become a useful tool as soon as data from all over the world are collected and processed.

ESSENCE (Electronic Surveillance System for the Early Notification of Community-based Epidemics) is such a system that, however at the moment is limited to DoD out-patient data. A modification to better differentiate ICD-9 diagnostics on one hand and including data from deployment into it will lead to a much stronger tool. Its value is clearly demonstrated in a second paper on that topic by Victor MACINTOSH especially when correlated to the CDC data.

TMIP (Theater Medical Information Program) appears to be another alternative and has the advantage that it has been fielded.

JMeWS (Joint Medical Workstation) is part of TMIP. It is Web based and allows not only medical authorities to evaluate the gathered information but also the commanders, thus bridging a gap between the medical and the military part of the forces. Thus it will be a very useful tool for epidemiological studies depending on the data fed into it. It may be thought of including mental health screening data in the system too, so that later this information may be connected to other ones. This will be ideal for researchers but problems with the privacy of such information and their possible misuse may be seen.

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MEDBASE presented more like a sales show than scientifically is a system that is aimed at collecting all data of all soldiers without paper and pencil tools. It has been developed for the army, where commanders may control the health status of their soldiers and to avoid all the pitfalls of earlier systems. The link to existing systems and their incorporation or at least use could not be clearly demonstrated. But a bridge may be constructed via the CHCS II.

Another system that has been developed is called MDSS (Medical Data Surveillance System). It showed its immediate use by diagnosing dermatological problems in one unit. After the personnel of the Joint Task Force Headquarters were able to locate the unit, the problem was solved immediately. In this very simple example I dare say that a caring medical officer or nurse, who uses their time reflecting about the data they get instead of typing them into a keyboard might have had the same result. But it is good to know that data processing systems are able to compensate for human failures.

Another paper on that topic (# 12, REIFMAN et al.) was an overview of what should be considered and thought of by critically reviewing the literature. This valuable paper should initiate many new thoughts by the developers of the other systems.

The paper of SCHMORROW et al gave a sight into the future where every soldier has its own data acquisition capability. What will be needed than is an electronic headquarter that filters all incoming data. Additionally the military use may be different. If such an individual data logger and transmitter would reduce the time span between being wounded and receiving first medical treatment it will save many lives. Thus the system must be followed on but there has to be a very effective way of reducing the mass data flow and minimizing the battery weight (lighten the soldier!).

In contrast to the presented surveillance systems for present or future use the EPINATO system was evaluated several years after its development. The results did not show beneficial effects of the system, which is not used by many forces.

A completely different approach of multinational cooperation was presented DIAMANTOPOULOS et al. This multi-nation approach using the principles of telemedicine connecting hospitals in different countries may serve as a model state-of-the-art medical surveillance system, which owns the potential to be utilized in several ways (e.g. C3, medical planning, casualty management) both in mobile units, and in case of civilian events, such as a major catastrophe with mass destruction.

All these excellent surveillance systems, however, would be less useful if the reaction capabilities would not have been developed in parallel. Thus two originally quite different science branches, information technology and microbiological diagnostic and genetics work hand in hand. It was therefore consequent by the organizers of the symposium to devote a session to the modern detection and diagnostic systems for diseases and possible terrorist attacks with biological MWD.

One major topic that was addressed too little is the user friendliness of the interfaces. All the surveillance systems are only as good as the data are reliable and correct. Since there is little time for training all interface users they have to be constructed according well established rule of software ergonomics and they should be self guiding using the symbols and hot keys that are familiar to them from the home computers.

The advantage of close supervision of the health status of the military allows even now a days the start of thorough epidemiological research. The side effect of this capability can be an early warning - even of the civilian population - of an outbreak of influenza or influenza like diseases.

Health care can be seen as a chain of interventions. They range from indoctrination and training for a healthy life style to hygiene and prevention, to care of the wounded or traumatized, to the rehabilitation of veterans. The specific health interventions were not the part of the symposium, but the systems that can monitor health risks, exposures, or health changes.

One new idea was introduced into a HFM symposium and that is, that the discussion should be included into the proceedings. It has been documented in AGARDOGRAPHS that during the discussion very valuable information is added to the presentation or to the presenter. We are proud that we were able to reach this goal. Thus these proceedings will have an additional wealth of information.

Part 2: Technical Remarks:

One could easily say this Symposium was an US-American event with some international participation. 2 Key Note speakers and 20 presenters came from US which is 65%, 4 presentations were from The Netherlands (12%), 3 presentations came from Canada (9%), 2 from Georgia (6%) and one each (3%) from Greece, and Bulgaria.

Thus it appears to be advisable to ask future program committees to search for papers from more countries and to directly address the national voting members for presentations from their countries. This appears to be the only means to accomplish one of the goals of RTO: "The mission of RTO is to conduct and promote co-operative research and information exchange."

The fact, however, that this was almost an American event with some international contributions led some native English speakers to forget that RTO is an international auditorium where many participants may be less fluent in the English language. Some of them spoke rather fast; many of them used abbreviations, which may be familiar to US military but not to all NATO countries. Thus they probably did not get all the information they presented to all of the audience, which is a pity.

Some studies on human pathology suffered, I'm happy to admit, from too small numbers. Therefore difficulties arose whether social problems are the consequence of difficulties in coping with traumatic events during deployment or whether the difficulty in coping with extraordinary events pre-existed and was brought into the military life by the soldier himself: Does the military attract people with coping problems or poor social resources? The Dutch answer was: yes!

In this area much research effort has to be accomplished before we can reach evidence based results. Here an international cooperation as has been put forward by this symposium is urgently needed. Thus the symposium has fulfilled its purpose: information has been exchanged and networks may be started. The information exchange has also been documented by the vivid discussions, which are very valuable for the authors as well since they may learn where future research should be directed to.

Another point that has to be mentioned is that some of the slides shown did not follow the rules of ergonomic presentations with respect to letter size, description of abscissas and ordinates and using unexplained abbreviations. If the purpose of a slide is to illustrate and underline the spoken word, a number of presenters forgot about this. If the listener is distracted by poor slides he is less capable to follow the spoken word and the message may get lost, which again is a pity.

RECOMMENDATIONS

- The publication of the presentations should be sent to a wide audience working in the scientific, operational and management field of the NATO military medical services. This can contribute to the lack of interaction due to the cancellation of the symposium.
- Further action should be taken to integrate work on this topic that is done in various countries. Especially the NATO/COMEDS working groups and NATO/NAS should be informed, to make it possible to change NATO procedures.
- Use any effort possible to make all system as the user friendly as possible. If the soldier who enters the data does not understand why he/she should enter what and where the input may be wrong and then the whole data will be wrong. So improving surveillance and data collections systems may result in poor data if they are typed incorrectly into the system.
- Another point that should be kept in mind is that these devices need energy and batteries are heavy.